CALS TEST NETWORK

CTN Test Report 90-011

UCRL-ID-103202

Technical Publication Transfer Test with Boeing Computer Services: MIL-M-28001 (SGML) and MIL-D-28000 Class I (IGES)

Quick Short Test Report

March 23, 1990

Prepared for
Air Force Logistics Command
AITI Project

Lawrence Livermore National Laboratory

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Contents

1 Test Parameters

Test Plan: CTN89-TM-23

Date of Evaluation: December 27, 1989

Evaluators: Lawrence Livermore National Laboratory
P.O. Box 808, L-542
Livermore, CA 94550

Syscon Corporation
3990 Sherman Street
San Diego, CA 92110

Data Originator: Boeing Computer Services
Publishing Systems
P.O. Box 24346
Seattle, WA 98124-0346

Data Description: TO 11-W89.XX-2

Intended	1 document declaration file 6 text files 1 IGES file 1 DTD file
Actual	6 document declaration files 6 text files 1 IGES file 6 DTD files

Data Source System:

1840A/SGML	Interleaf Technical Publishing System 4.0.66 Interleaf CALS Preparedness Package (Beta) Apollo DN4000 Computer operating AEGIS 10.1
IGES	Interleaf IGES Processor 1.0

Evaluation Tools Used:

1840A	CTN TAPEVAL (0.9) VAX/VMS
SGML	Datalogics DTD and SGML Instance Parsers
IGES	IGES Data Analysis, Inc. Parser/Verify/View Rosetta Technologies, Inc. PreVIEW

Standards Tested: MIL-STD-1840A Notice 1 (1840A)
MIL-M-28001 (28001)
MIL-D-28000 Amendment 1 (28000) Class I

2 1840A Analysis

2.1 External Packaging

Boeing Computer Services requested that the CTN not analyze the external labeling and packaging.

2.2 Transmission Envelope

2.2.1 Tape Formats

Boeing copied all files to tape at the correct record lengths and block sizes. The variable length files contained illegal line feeds at the end of every line.

2.2.2 Declaration Files and Header Fields

CTN analysis of the 1840A declaration files and header fields revealed the following errors:

First, Boeing Computer Services planned to write an 1840A tape containing a document of six chapters. The data set should have contained one declaration, one IGES, one DTD, and six SGML instance files. The tape actually contained six declaration, one IGES, six DTD, and six SGML instance files. Due to a design limitation that Boeing was not aware of, the beta version of Interleaf's software created a declaration and a DTD file for each text file. These extra files caused the file count records in the declaration files to be in error. Had the software not created the extra declaration and DTD files, the file count registered within the original declaration file would have been correct.

The design limitation mentioned above is that the beta software does not allow multiple SGML instance files under one document declaration file. The Interleaf software instead requires the user to merge the chapters into one SGML instance file before preparing the CALS document. Interleaf plans to correct this limitation in a future software release.

A blank line placed after the 1840A header fields and before the IGES data created a second error. This blank line, if not accounted for, could halt an IGES processor. The problem's cause, however, is that the 1840A standard does not clearly state that it does not allow a blank line after the last header field. The CTN will recommend this change to 1840A. Interleaf, already aware of the problem, has modified its latest software release accordingly.

3 SGML Analysis

Due to the errors mentioned in section 2.2.2 of this report, the Interleaf software treated each of the six SGML instance files as separate documents. The software added the appropriate tags to correctly allow this separation. The CTN removed these extra tags and appended the files together for parsing. The parser revealed that, in this form, the SGML complied with 28001.

4 IGES Analysis

Detailed analysis and display of the IGES file was not possible because the file was syntactically incorrect. The CTN, however, did discover the following:

Interleaf created the syntactically incorrect file by writing parameter data past the line boundary of the IGES Parameter Data Section. Technically, this parameter data includes both the value and its trailing delimiter; the line boundary is column 64. This field overrun makes the file unprocessable by almost any translation or evaluation software. Also, the Global Section's IGES Version Number stated that the file conformed to IGES Version 2.0, a version that 28000 does not allow. Upon questioning however, Interleaf claims it writes its IGES data to Version 3.0, but that the processor inserted the wrong value. Furthermore, the file did not contain the Drawing (404) and View (410) Entities as required by 28000. Lastly, the file did not contain in its Start Section the statement of conformance to the subset nor an illustration identifier as 28000 requires. Technical representatives at Interleaf now know of these problems and hope to address them in future releases.

This IGES file also reemphasized the issue of data quality. Boeing's IGES file was unusually large (13MB) due to the procedure used in its generation. Boeing originally scanned most of the illustration into the company's CAD system. During this process, the computer conducted a raster to vector conversion on the data. Boeing then merged the scanned data with a smaller portion of the illustration previously saved as a wire frame model. Finally, Boeing transferred the illustration to the Interleaf system which produced the final IGES file.

It is difficult to pinpoint the real culprit, but the CTN believes the following is true. The original raster to vector conversion created an illustration not of the usual ellipses, text, dashed lines, and shading, but of tiny line segments. This file of line segments never regained any functionality; it only decomposed further through each data translation. This both increased the file's size and decreased the illustration's usefulness. A graphics file of this size and limited functionality might have been better represented as a raster image. In our experience, scanners with raster to vector converters are rarely able to create functional IGES data.

The 28000 specification, however, does not currently disallow this method of representation (advanced alphanumeric and geometric constructs saved as line segments). This points to the need for more stringent requirements on the quality of digitally delivered data. The CTN has and will again recommend that data quality be addressed in the CALS standards.

5 Conclusions and Recommendations

In summary, the 1840A tape from Boeing Computer Services created a good learning experience for all. The test helped Boeing find a design limitation in its Interleaf software. In addition, Interleaf learned that its software leaves incorrect spaces between the 1840A headers and data portions of its files. Interleaf also learned that its IGES files are syntactically incorrect and do not meet all of 28000's requirements. Finally and most importantly, the CTN rediscovered ambiguities and data quality issues in 1840A and 28000. These will lead to further CTN recommendations for changes to the standards.

The CTN recommends that:

1. 1840A must clearly state that the data must begin immediately after the last header record, and that

2. the standards need to address more stringent requirements on the quality of digitally delivered data.